



The Relationship of Serum Levels of Tumor Necrosis Factor α (TNF α) Cytokine with Asthma

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Abstract

Asthma is defined a respiratory chronic disease described by inflammation of airway and remodeling, leads to coughing, wheezing and obstruction in response to an allergens or inorganic pollutants. The objective of this study is to investigate the level of pro – inflammatory cytokine TNF- α . This study consists of two groups: fifty asthma patients (28 female and 22 male) and twenty five apparently healthy as a control group (9 female and 16 male). Recruited from the Alzahra'a Center for Asthma Allergy during the period extended from October /2017 to last February /2018. Subject information was collected using specific a questionnaire form as a descriptive study including: age, gender, season, smokers, family history, onset of disease, other diseases like bronchitis, pneumonia or allergy, take a treat or not. Where age from 20-60 years old, 6 smokers in control group and 8 in patient group. Human TNF α concentration was estimated by ELISA, the results showed the level of TNF α concentration in serum was not elevated in most asthma samples, there were no statistically significant differences in the levels between patients and control groups.

Keywords: Asthma, TNF α , Cytokine

INTRODUCTION

Asthma may be a common chronic disorder of the airways that's complex and characterized by continual and variable symptoms, flow of air obstruction, bronchial hyper-responsiveness, associated an underlying inflammation, the interaction of those options of respiratory illness determines the clinical manifestations and asthma severity and therefore the response to treatment (1). According to the report of WHO, (2008) who referred that the prevalence of asthma in Iraq is About 8.3 per 1000 persons, there is almost the same prevalence between urban and rural areas, there is higher prevalence in the Centre /South region than in Kurdistan (6.0 and 8.6 per 1000 persons respectively). The rates prevalence increase steadily with age, with the highest number of reported cases among those over the age of 50, with small difference between female and male rates 7.7 and 8.8 per 1000 respectively (2). In 2001, About 20.3 million people were suffered from asthma, including 6.3 million children under the 18 age years old, in recent years, the number of persons with asthma has raised at an rate alarming, the incidence of asthma has more than doubled Since the 1980's and The American Lung Association has estimates that the ratio will double 2020 again (3). Tumor Necrosis Factor- α (TNF α) is a potent proinflammatory cytokine that share in inflammatory response of airway in cases of atopic asthma, nevertheless, prior study showed that Tumor Necrosis Factor- α plays a vital function in (BA) bronchial asthma pathogenesis among different persons and raised of bronchial hyper responsiveness (4).

The present study aims to determine the relation of serum levels of Tumor Necrosis Factor α (TNF α) cytokine with asthma in Iraq.

MATERIALS AND METHODS

Fifty patients (28 female and 22 male) with asthma were admitting the Alzahra'a Center for Asthma Allergy in Baghdad during the period between October /2017 to last February /2018. Twenty five apparently healthy volunteers include 9 female and 16 male, their age matched the patients group, and included no history of asthma, allergy or other pulmonary diseases. The study design was approved by the Institute of Genetic Engineering and Biotechnology for Postgraduate Studies/ University of Baghdad. Writing informed consents were obtained from all patients and apparently healthy control group; all patients were diagnosed according to clinical examination by a chest physician and selected according to the criteria of the global initiate of asthma, spirometry was performed to measure FEV1 (forced expiratory volume in 1 second) and FVC (forced vital capacity).

TNF- α ELISA kit KOMA BIOTECH Company was used in this study.

RESULTS AND DISCUSSION

Evaluation the Concentrations of TNF- α by ELISA

The normal range of human TNF- α concentration is (-15 to +75 pg/ml), the results show no significant between asthma patient and control that may be because the small sample size that used in this study (Table 1), the concentration of TNF- α in asthma patient range from 1.42 to 438.02 pg/ml while in control the concentration of TNF- α range from 1.38 to 395.62 pg/ml, in both asthma patients and control there was only two samples positive. TNF- α and IL-8, serum levels were higher in acute asthma compared to moderate- mild asthma patients or control group (5). The expression of TNF- α gene is elevated in cases of severe asthma (6). there are no changes in the level of TNF- α of children with atopy, compared to children without atopy whose disease was stable, no significant changes in serum level of TNF- α were observed in children with asthma and food allergy after the challenge test with both placebo and allergens (7). this study was conducted for people who are infected with *Chlamydia pneumoniae* bacteria, those infected with these bacteria are divided into two groups: a group with asthma and a group without asthma, TNF- α level were significantly lower in group with asthma compared with non-asthma group (8). This study included measurement of serum cytokines levels in parents with asthma and children, among these cytokines are TNF- α , indicated that the level of TNF- α rises in asthmatic adults and decreases in asthmatic children, indicating that the levels of cytokines in asthmatics varied by age (9). A study in America included measurement of 11 levels of chemokines and cytokines in serum in adults with asthma and children, among these cytokines are TNF- α , indicated that the level of TNF- α rises in asthmatic adults and decreases in asthmatic children (10). In a study in Egypt on TNF- α - gene 308 GA polymorphism may be a contributing factor to the severity and susceptibility of asthmatic children (11). Previous studies in North Indian also explained that gene of TNF- α 308 GA promoter polymorphism was linked with asthma patients (12, 13, 14). Study in china including among 5477 asthma patients and 5962 controls, the results were explained that gene of TNF- α rs1800629 polymorphism association with asthma and considered risk factor (15). Conclusion involved that TNF- α concentration being not elevated in asthma patients may be due to the small sample size used in this study as well as affected by other diseases.

Table 1: the mean of TNF- α in the studied group

Group	No.	Mean \pm SE
Patients	50	43.75 \pm 10.93
Control	25	47.41 \pm 15.33
T-Test	---	37.636 NS
P-value	---	0.847

NS: Non-Significant.

Table 2: Distribution of difference level of factors with TNF- α result of asthma patients

Factors	Levels	No. (%)	P-value
Age	Less than 30	13 (26.00%)	0.0076 **
	30-40	13 (26.00%)	
	More than 40	24 (48.00%)	
Sex	Male	21 (42.00%)	0.0097 **
	Female	29 (58.00%)	
Smoking	Yes	8 (16.00%)	0.0001 **
	No	42 (84.00%)	
Season	Outman	34 (68.00%)	0.0052 **
	Winter	16 (32.00%)	
Family history	No	20 (40.00%)	0.0081 **
	Yes	30 (60.00%)	

** (P<0.01).

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